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SPECIFICATION FOR COPPER OXYCHLORIDE DUSTING POWDERS

(Second Revision)

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Indian Standard

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(Second Revision)

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Indian Standard

SPECIFICATION FOR COPPER OXYCHLORIDE DUSTING POWDERS

(Second Revision)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Indian Standards Institution on 31 January 1977, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 This standard was first issued in 1959 and was revised in 1967. The second revision has been issued to incorporate the requirements for packing and tolerances as permitted in the nominal active ingredient of the formulation. In this revision modified test method for estimation of copper content has also been incorporated.

0.3 Copper oxychloride dusting powders are largely used as fungicides for the control of plant diseases.

0.4 Copper oxychloride dusting powders are generally manufactured to contain 4 percent (*m/m*) of copper.

0.5 In the preparation of this standard, due consideration has been given to the provisions of the Insecticides Act, 1968, and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960[*]. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for copper oxychloride dusting powder formulations.

---

[*] Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Description — The material shall be in the form of free flowing powder, devoid of hard lumps and of uniform colour ensuring uniform dispersal of copper oxychloride technical, in the filler used. The material when dusted from a hand rotary duster shall issue freely without clogging or bridging.

2.2 Copper oxychloride, technical, employed in the manufacture of this material shall conform to IS : 1486-1969*.

2.3 Colour — The colour of the material shall be subject to the agreement between the purchaser and the vendor.

2.4 The material shall also comply with the requirement given in Table 1.

TABLE 1 REQUIREMENTS FOR COPPER OXYCHLORIDE DUSTING POWDER

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix of this standard	Cl No. of IS : 6940-1973*
(1)	(2)	(3)	(4)	(5)
i)	Copper content, percent by mass	Nominal value as declared on the container (*see* 2.4.1)	A	—
ii)	Material passing through 75-micron IS Sieve†, percent by mass, *Min*	90	—	12.1
iii)	Bulk density after compacting	Not to exceed the value obtained before compacting by more than 60 percent	—	12.2
iv)	Alkalinity (as Na_2CO_3), percent by mass, *Max*	0·1	B	—

*Methods of tests for pesticides and their formulations.

†*See* IS : 460-1962 Specification for test sieves (*revised*). BS Test Sieve 200, ASTM Test Sieve 200, Tyler Test Sieve 200 have their apertures within the limits specified for the above IS Test Sieve, and may, therefore, be used as 75-micron IS Sieve.

---

*Specification for copper oxychloride, technical (*first revision*).

2.4.1 *Copper Content* — When determined by the method prescribed in Appendix A the observed copper content, percent (*m/m*) of any of the samples shall not differ from the declared nominal value by more than the tolerance limits indicated below:

Nominal Value, Percent	*Tolerance*	
Up to 9	+ 10 − 5	Percent of the nominal value
10 and below 50	± 5	
50 and above	+ 5 − 3	

2.4.1.1 The actual value of copper content shall be calculated to two decimal places and then rounded off to one decimal place before applying the tolerance as stipulated in **2.4.1**.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in accordance with relevant provisions of IS : 8190 (Part I)-1976*.

3.2 Marking — The following information shall be marked legibly and indelibly on each container in addition to the information required under the Insecticide Act and the Rules:

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch number;
e) Copper content (*m/m*), percent;
f) Net mass of contents; and
g) The minimum cautionary notice worded as follows:

> 'SLIGHTLY HAZARDOUS. ALWAYS STORE IN SAFE PLACE. DO NOT USE EMPTY CONTAINERS FOR STORAGE OF FOODSTUFFS AND ANIMAL FEED. IMMEDIATELY AFTER HANDLING WASH HANDS THOROUGHLY WITH SOAP AND WATER. IN CASE OF POISONING CALL A PHYSICIAN. FOR TREATMENT IN CASE OF POISONING, SEE INSTRUCTION SHEET ACCOMPANYING THE CONTAINER.'

3.2.1 When packed in bags (*see* **3.1**), the pictorial marking for 'USE NO HOOKS, DO NOT PUNCTURE' as specified in IS : 1260 (Part II)-1973†, shall be stencilled on the bags.

---

*Requirements for packing of pesticides: Part I Solid pesticides.

†Pictorial markings for handling and labelling of goods: Part II General goods (*first revision*).

3.2.2 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in ' Indian Standard methods for sampling of pesticides and their formulations ' (*under preparation*).

NOTE — Till such time this standard is published, the samples shall be drawn as agreed to between the parties concerned.

5. TESTS

5.1 Tests shall be carried out by the methods referred to in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1960*) shall be employed in tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of analysis.

APPENDIX A

[*Table* 1, *Item* (i)]

DETERMINATION OF COPPER CONTENT

A-1. PRINCIPLE

A-1.1 Copper is determined by titration of iodine liberated on addition of potassium iodide to the weak acidic solution. Difficulties with absorption of iodine on the cuprous iodide precipitate are avoided by the addition of potassium or ammonium thiocyanate.

---

*Specification for water, distilled quality (*revised*).

A-2. REAGENTS

A-2.1 Nitric Acid — sp gr 1·42 (*see* IS : 264-1968*).

A-2.2 Urea

A-2.3 Sodium Carbonate — anhydrous (*see* IS : 296-1965†).

A-2.4 Dilute Acetic Acid — 10 percent (*v/v*).

A-2.5 Potassium Iodide

A-2.6 Standard Sodium Thiosulphate Solution — 0·1 N, standardized with potassium iodate or potassium dichromate.

A-2.7 Starch Indicator Solution — One percent (*m/v*) (freshly prepared).

A-2.8 Potassium or Ammonium Thiocyanate

A-3. PROCEDURE

A-3.1 Weigh accurately a quantity of the material containing 0·2 g of the active ingredient (copper) into a 500-ml conical flask. Firstly, add 25 ml of water and then 5 ml of concentrated nitric acid carefully to avoid any spurting. If necessary, shake and warm the mixture to effect complete dissolution. Heat this mixture to reduce the volume to a low bulk (about 5 ml). Add 30 ml of water to this dried material and boil for 5 minutes. Remove the flask from the flame, add one gram of urea and boil the mixture again for about 10 minutes. Cool to room temperature and add sodium carbonate in small quantities until a faint permanent precipitate or blue colour is produced. Add dilute acetic acid dropwise until the blue colour or precipitate disappears. If necessary, filter the solution. Add 1·5 to 2·0 g of potassium iodide and titrate immediately the brown solution with the standard sodium thiosulphate solution to a pale straw colour. Add about 2 ml of starch indicator solution and one gram of potassium or ammonium thiocyanate and continue the titration until the blue colour is just discharged.

A-4. CALCULATION

$$\text{Copper content, percent by mass} = \frac{6{\cdot}357\ VN}{M}$$

---

*Specification for nitric acid (*first revision*).

†Specification for sodium carbonate, anhydrous (*revised*).

where

V = volume in ml of the standard sodium thiosulphate solution required for the test with the material (*see* **A-3.1**),

N = normality of the standard sodium thiosulphate solution (*see* **A-5.1** and **A-5.2**), and

M = mass in g of the material taken for the test (*see* **A-3.1**).

A-5. STANDARDIZATION OF SODIUM-THIOSULPHATE SOLUTION

A-5.0 General — For standardization of sodium thiosulphate solution, two methods, namely, titration against potassium iodate or potassium dichromate solution have been specified. Either of these two methods may be used for standardization of sodium thiosulphate solution, but the method employed should be stated while expressing the results of a test.

A-5.1 Standardization with Potassium Iodate

A-5.1.1 *Reagents*

A-5.1.1.1 *Potassium iodate* — to be ground and dried at 105°C for 2 hours immediately before using.

A.5.1.1.2 *Potassium iodide* — iodate free.

A-5.1.1.3 *Starch indicator solution* — one percent (m/v) (freshly prepared).

A-5.1.1.4 *Standard hydrochloric acid solution* — approximately 2N (chlorine free).

A-5.1.2 *Procedure* — Weigh accurately about 0·15 g of potassium iodate and dissolve it in 40 ml water in a conical flask. Stopper securely, shake to dissolve and add 2 g potassium iodide and about 6 ml of standard hydrochloric acid solution. Titrate the liberated iodine with the thiosulphate solution with constant shaking. When reaction is nearly complete, as indicated by pale yellow colour of the solution, dilute with distilled water to about 200 ml. Add 2 ml starch indicator solution and continue titration until the solution becomes colourless.

A-5.1.3 *Calculation*

A-5.1.3.1 Normality (N) of sodium thiosulphate solution $= \dfrac{28{\cdot}04 \times m}{v}$

where

m = mass in g of potassium iodate, and

v = volume in ml of sodium thiosulphate solution required.

A-5.2 Standardization with Potassium Dichromate

A-5.2.1 *Reagents*

A-5.2.1.1 *Potassium dichromate* — dried at 105°C for two hours immediately before using.

A-5.2.1.2 *Standard hydrochloric acid solution* — approximately 2 N (chlorine free).

A-5.2.1.3 *Potassium iodide* — free from iodate.

A-5.2.1.4 *Starch indicator solution* — one percent (*m/v*) (freshly prepared).

A-5.2.2 *Procedure* — Weigh accurately between 0·20 g and 0·23 g of potassium dichromate and transfer to a 500-ml conical flask fitted with a ground glass stopper. Add 100 ml water and 2 g potassium iodide and shake until the salt dissolves. Add with swirling 10 ml standard hydrochloric acid solution, stopper the flask and immediately place in a dark place for 10 minutes. Titrate the solution with sodium thiosulphate solution. When the solution turns yellowish-green in colour, add 1 ml of starch indicator solution. Continue the addition of sodium thiosulphate solution dropwise until the blue black colour formed on the addition of starch indicator solution changes to pale green.

A-5.2.2.1 Carry out a blank determination, using distilled water instead of the potassium dichromate solution, by the same method (**A-5.2.2**). If the potassium iodide is iodate free, the volume of sodium thiosulphate solution used shall be 0·05 ml or less.

A-5.2.2.2 Normality (N) of sodium thiosulphate solution $= \dfrac{20 \cdot 4\, m}{v_1 - v_2}$

where

m = mass in g of potassium dichromate,

v_1 = volume in ml of sodium thiosulphate solution consumed, and

v_2 = volume in ml of sodium thiosulphate solution consumed in the blank.

APPENDIX B

[*Table* 1, *Item* (iv)]

DETERMINATION OF ALKALINITY

B-1. REAGENTS

B-1.1 Standard Sulphuric Acid — 0·1 N.

B-1.2 Methyl Orange Indicator Solution — 0·1 percent. Dissolve 0·5 g of the indicator in 100 ml of alcohol and make up the volume to 500 ml with distilled water.

B-2. PROCEDURE

B-2.1 Weigh accurately about 10 to 25 g of the material into a 400-ml beaker. Add 100 ml of distilled water (freshly boiled and cooled, carbon dioxide free). Stir the mixture for 30 minutes. Filter and then titrate the filtrate against the standard sulphuric acid using methyl orange as an indicator.

B-2.2 Carry out a blank determination using 100 ml of distilled water (freshly boiled and cooled, carbon dioxide-free).

B-3. CALCULATION

$$\text{Alkalinity as sodium carbonate (} Na_2CO_3 \text{), percent by mass} = \frac{5{\cdot}3\,(V - v)\,N}{M}$$

where

V = volume in ml of the standard sulphuric acid required for test with the material (*see* **B-2.1**),

v = volume in ml of the standard sulphuric acid required in blank determination (*see* **B-2.2**),

N = normality of the standard sulphuric acid, and

M = mass in g of the material taken for the test (*see* **B-2.1**).

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